

Development of Sediment Quality Objectives for California Bays and Estuaries

Scientific Steering Committee Conference Call Additional Discussion of MLOE Framework and Chemical Indicators July 17, 2006

Summary of Call and SSC Comments

Call participants (SSC and project representatives)

Peter Landrum (NOAA)
Todd Bridges (U.S. Army Corps of Engineers)
Ed Long (ERL Environmental)
Rob Burgess (USEPA)
Bob Van Dolah (S. Carolina Dept. of Natural Resources)
Tom Gries (Washington Dept. of Ecology)
Brock Bernstein
Chris Beegan (SWRCB)
Steven Bay (SCCWRP)
Stephen Weisberg (SCCWRP)

Others present (partial list)

Bruce Joab (Calif. Dept. Fish and Game, OSPR)
Lisa Haney (Los Angeles County Sanitation Districts)
G. Fred Lee (Lee and Associates)
Kerry Ritter (SCCWRP)
Doris Vidal (SSCWRP)
Bruce Thompson (SFEI)
Jay Field (NOAA)
Dan McClure (RWQCB Region 5)
David Moore (Weston Solutions)
Elaine Carlin (consultant to San Diego Bay Council)

Summary

The Chair of the SSC described the goal and format for the call. The purpose of the call is to discuss three aspects of the State's SQO program: category level agreement of the MLOE framework with expert opinion, development of the chemical indicator based on benthic community response, and predictive ability of the chemical indicators.

MLOE Framework

Steve Bay summarized the information provided in the background documents distributed before the call. A comparison of the results for 25 validation samples evaluated by experts showed a high level of agreement with the MLOE framework. There was 80-88% agreement between the two classification approaches regarding whether the sample was in the unimpacted group or in the impacted group. There were only two samples that were classified by the MLOE framework

as being in a lower impact category, relative to the experts. The incorporation of draft suggestions by the SSC regarding the use of the inconclusive category resulted in the assignment of one sample as inconclusive, but this did not have a major effect on the classification accuracy.

The SSC chair asked the other SSC members to carefully review the suggested modifications to the MLOE framework (i.e., additional inconclusive categories) for unintended consequences. No additional requests for modification of the MLOE framework were proposed by the SSC.

Benthic Category Score Chemical Indicator

The process used to develop a chemical indicator based on the Benthic Category Score (BCS) was described. The BCS is a chemical-specific value that is calculated from two parameters: a predicted benthic disturbance category and a weight factor. The benthic disturbance category is determined by comparing the chemical concentration to effect values derived from the empirical relationship between the concentration and the level of benthic community disturbance. The weight factor is based on the magnitude of correlation among the data. The BCS is calculated for each chemical by multiplying the category prediction (1-4) by the weight. The chemical exposure category of the chemical mixture present in a sample is calculated as the weighted mean of the individual BCS values.

Discussion of the BCS approach focused on the weights calculated for several chemicals. The low weight for PAHs is contrary to expectations based on other studies. However, the low correlation between PAH concentration and effects on the benthos is similar to the pattern shown for sediment toxicity in the California data set. One contributing factor to this situation may be the relative lack of high PAH concentrations in the California data; there were only two samples in the south with total PAH concentrations greater than the NOAA ERM. The relatively high correlations between several metals and benthic community effects were also noted by the SSC. These correlations for relatively innocuous metals (e.g., zinc) suggest that variations in geological characteristics may be influencing the relationships instead of toxic effects. The science team agreed and assured the SSC that the program documentation will state that these are empirical relationships and that the individual chemical effects values developed for the program do not represent a causal relationship. The SSC agreed and recommended that the SWRCB emphasize that individual chemical indicator values should not be used as regulatory criteria.

Steve Bay pointed out that there were relatively few samples in the north (San Francisco Bay) with matched chemistry and benthic disturbance data. The available data do not appear to be representative of the chemical gradients in the bay and there are no samples with a highly disturbed benthos. It was recommended that use of the north version of the BCS indicator be delayed until additional data are available to support development and validation of the approach. Much more data are available for southern California and the science team recommended using the BCS together with CAPmax for classifying the level of chemical exposure in the south. There was no objection from the SSC regarding this recommendation. It was pointed out that there were samples from the 2001 NOAA Status and Trends survey in San Francisco Bay that would be helpful in development of the BCS, but that the data are not available for use at this time.

Chemical Indicator Predictive Ability

A table summarizing the % incidence and severity of toxicity for each of the four chemical exposure categories based on CAPmax was discussed. The results generally correspond with those reported by others in studies with other types of chemical indicators. The SSC asked whether the State of California has established a standard of accuracy that the chemical indicator must meet; no standard has been established. There was also discussion regarding what factors are likely to prevent higher levels of accuracy among the candidate chemical indicators; a lack of complete chemical analysis, variations in chemical bioavailability, and a limited toxicity test suite were identified as contributing factors.

The SSC concluded that the predictive ability of the CAPmax was satisfactory, relative to the results of other studies. The SSC also reiterated that a chemical mixture approach should be used to characterize chemical exposure, rather than individual chemical values.

A table showing the incidence of benthic community disturbance associated with the predicted chemical exposure categories was discussed. The results were similar to those obtained using the CAPmax and toxicity. There were a greater proportion of affected samples in the minimal exposure category, compared to CAPmax, which may be due to the effect of physical factors on the benthic community. The SSC questioned whether inclusion of the BCS as an additional chemical indicator would create too much complexity in evaluating the data; Chris Beegan stated that the level of complexity was not excessive.

The SSC mentioned that additional California data will become available and that there should be a process for revisions of the MLOE framework and indicators. Washington attempted to revise its sediment quality standards, but the effort was not successful due to political factors. Chris Beegan stated that he expects that there will be periodic revision of the SQO policy; a schedule for revision is specified in the State Water Code.

The SSC provided two additional suggestions regarding the chemical indicators: the table of % incidence of toxicity by chemical exposure category should be included in the chemical indicator technical report, and the process used to select the indicator thresholds (i.e., the optimization procedure using the Kappa statistic) should be described in greater detail.

The SSC also wishes to reiterate that the uncertainty/error rates associated with the derived chemical guidelines provides further, specific support for the need to use multiple lines of evidence when reaching conclusions about sediment quality.

The Advisory Committee and other participants on the call provided no additional questions or comments.

The SSC discussed upcoming activities relating to review of the technical documents. Five documents that provide the basis for the SQO program recommendations are in preparation and the SSC will be asked to review them. Steve Bay suggested that each document should be reviewed separately, as soon as it is available for distribution. A conference call may be needed to discuss each document. Several strategies for coordinating the review and sharing the time burden were discussed. One strategy is to designate a SSC member as a lead reviewer for each

document, with the responsibility to coordinate and compile input from the others. Chris Beegan mentioned that the policy will be in draft form for an extended period of time and that the SSC's reviews were not needed right away. A face-to-face meeting of the SSC will be scheduled for early 2007 in order to provide closure to Phase I of the SQO program development.